PATENT

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Applicant(s):	Helen Biddiscombe
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Commissioner For Patents
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Dr. Karl-Heinz Kochem, being duly sworn, deposes and says:

1. I am R&D manager of the R&D Label Division of Treofan Germany GmbH&Co.KG, with responsibility for general R&D management worldwide of label films within Treofan.

2. I have over twenty years of experience in the industry, of which the last sixteen years have been specifically directed to films. I obtained a diploma in Physics in 1982 from Kaiserslautern University and a PhD in Experimental Physics from Kaiserslautern University in 1986. After 3 years of R&D work on semiconducting light sensitive layers for television pick-up tubes at Heimann GmbH (Wiesbaden, Germany), I joined the R & D department of Hoechst AG in 1989 working on different coating developments for polyester films. In this position I dealt with coatings based on sputtered layer systems,

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electrically conducting polymers and organic barrier layers. In 1992, I became responsible for the R&D work for Technical PP films (capacitor films) of Trespaphan. This work involved dealing with biaxially oriented very thin PP films for the capacitor industry. In addition to this responsibility, I worked on the development of metallizable films and opaque and white packaging films. In 2001 I became the head of the R&D Label Division of Trespaphan / Treofan with worldwide responsibility for label films.

My work on opaque packaging films and label films (mainly also opaque film grades) has given me a deep, profound and extensive knowledge of the technology of creating a voided film structure. In addition, for the last three years I have dealt extensively with the technology of microporous film structures, as a technologically different field of work than voided film structures. As shown by my experience, I am very familiar with polymeric films, especially with both voided films and microporous films. Furthermore, my position at Trespaphan/Treofan requires me to interact with many people within and outside of Trespaphan/Treofan, on a regular basis, in the relevant technology areas of voided films and microporous films. The following statements regarding my understanding of the differences between microporous films and voided films are based on both my extensive experience in these areas (microporous films and voided films), as well my daily interaction with others who practice in these areas.

3. I am a named inventor in over 10 patent applications in the field of biaxially oriented polypropylene film.

4. I am very familiar with Polypropylene films. Polypropylene film was first manufactured in the 1960's. This early film consisted of a single layer of polypropylene homopolymer and was transparent and was used mainly for packaging. Such films were produced using stenter film technology, where the film is cast on a cooling drum and subsequently stretched first longitudinally and thereafter transversely. The stenter production process is

well known in the art.

5. I am very familiar with Polypropylene Voided Films. At the beginning of the 1970's it was found that the addition of incompatible particles of a certain size, such as $CaCO_3$, created voids during biaxial stretching of a polypropylene homopolymer layer containing the particles. Such a layer is referred to, in the industry, as a voided layer. These voids render a film opaque because the light is scattered at the interface between the air trapped in the void and the polypropylene homopolymer matrix. Voided films show a characteristic white, pearlescent appearance, often referred to as pearlescent lustre. The voiding also reduces the specific weight or density of the film

The matrix polymer and the void initiating particle must be incompatible and this term is used in the sense that the materials are two distinct phases. The void initiating particles constitute a dispersed phase throughout the lower melting polymer, where the polymer will, ultimately, upon orientation, become a voided matrix with the particles positioned somewhere in the voids.

These void initiating particles may be of any desired shape, but a minimum diameter is required usually in the order of at least 1 µm. The voids created by the particles tend to be of like shape when like particles are used, even though they vary in dimensions. Ideally, these voids assume a shape defined by two opposed and edge contacting concave disks.

As a result of biaxially stretching a layer of polypropylene containing said incompatible particles a thermoplastic polymer matrix within which is located a strata of voids results. From this it is to be understood that the voids create the configuration of the layer. The term "strata" is intended to convey the understanding that there are a large number of voids and the voids themselves are oriented so that the two major dimensions are aligned in correspondence with the direction of orientation of the polymeric film structure. After each

void has been formed through the initiation of the described particle, the particle generally contributes little else to the system. This is because its refractive index can be close enough to the matrix material that it makes no contribution to opacity.

A typical void of the layer is defined as having major dimensions X and Y and minor dimension Z, where dimension X is aligned with machine direction orientation, dimension Y is aligned with transverse direction orientation and dimension Z approximately corresponds to the cross-sectional dimension of the particle which initiated the void.

As is well known for a voided film, the voids are closed cells. This means that there is virtually no path open from one side of the core to the other through which liquid or gas can traverse. The resulting film has high quality appearance and excellent opacifying characteristics, low water vapor transmission rate and low oxygen transmission rate characteristics. This makes the film ideally suited for packaging food products, including liquids.

All of the above description regarding voided films is well known to those skilled in the art with polymer films, and especially to those skilled in the art with polymeric voided films. One skilled in the art would immediately recognize that a voided film has a closed cell structure.

6. I am also very familiar with Porous Polypropylene-based Resin Film or Microporous Polypropylene Film. A microporous film comprises a thermoplastic polymeric structure having a plurality of cells with adjacent cells being interconnected by passageways to provide a network of communicating pores. Microporous films have a structure that enables gas or even fluids to flow through them. The effective pore size is at least several

times the mean free path of the flowing molecules, namely from several micrometers down to about 100 Angstroms. Such sheets are generally opaque, even when made of a transparent material, because the surfaces and the internal structure scatter visible light.

Accordingly a porous polypropylene layer is characterized by a network of interconnected pores. The art of preparing microporous structures is replete with a wide variety of methods of producing such structures. The formation of microporous polymeric membranes can involve some modifications of a dense film to render it microporous. The second class of microporous polymeric layers are those which result from a phase separation phenomenon. The phase separation can be that of a liquid-liquid or a liquid-solid nature. The formation of microporous membranes through chemically induced liquid-liquid phase separation, commonly called phase inversion.

Porous films are generally characterized by a Gurley air permeability or water vapor permeability. A porous film has breathability and high water vapor permeability and is therefore widely used in the fields of light rainwear or work clothes and other moisture-permeable waterproof garments; paper diapers, sanitary products and other such absorbent articles; bed sheets and other hygienic merchandise; waterproof sheets, wallpaper and other construction materials; packaging materials for desiccants, deoxygenators, synthetic paper, filtration membranes and separation membranes, battery separators agricultural multi-sheets; and so forth.

7. The art of voided film and microporous film is recognized by skilled artisans to be different fields of technology, since the technology for making such structures are significantly different as well as the properties of the resulting products. One skilled in the art would not interchange the films or techniques for making of the films, as a porous (microporous) film is opposite a nonporous (voided) film. I would not consider a voided film the same as a microporous film. I also would not refer to a microporous film as a voided film, because

it contains pores or voids as they are two separate and distinct terms used for two separate and distinct films that have separate and distinct properties, advantages and disadvantages.

(signature)
Dr. Karl-Heinz Kochem

05.10.2005

Saarland, Germany